

DOCUMENT RESUME

ED 191 854

TM 800 247

TITLE ACER Class Achievement Test in Mathematics Years 4/5
(CATIM 4/5): Teachers Manual [and] Test Booklet.
INSTITUTION Australian Council for Educational Research,
Hawthorn.
PUB DATE Dec 79
NOTE 35p.
AVAILABLE FROM Australian Council for Educational Research Limited,
PO Box 210, Hawthorn, Victoria, Australia 3122
(\$3.25).

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Achievement Tests; *Answer Sheets; *Elementary
School Mathematics; Foreign Countries; Group Testing;
Intermediate Grades; Multiple Choice Tests;
*Quantitative Tests; Scoring; *Test Interpretation
IDENTIFIERS Australia: *Class Achievement Test in Mathematics;
Class Analysis Chart: Test Manuals

ABSTRACT

The Class Achievement Test in Mathematics (CATIM) test booklet and teachers' manual are presented. The 45-item multiple-choice test is intended for years 4-5 of the Australian school system, and measures four levels of mathematics skills: knowledge, computation, application, and understanding. Approximately 45 minutes are required to complete CATIM. Students record their responses on an answer strip, which (after perforation), is approximately 3/4 inch wide and 19 inches long. The completed answer strips are scored against an answer key to the Class Analysis Chart. The strips may be arranged on the chart according to student background characteristics, ability level, and so on, in order to easily illustrate patterns of response. Test results may be interpreted according to class results across content areas, class results on particular items, or individual results across content areas. Profiles of individual data or of class data may also be constructed. (GDC)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

australian council for educational research

CATIM

class achievement test in mathematics

YEAR 4/5

teachers manual

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.



Australian Council for Educational Research

FD191854

TM 800247 142

standardization of nomenclature for grades/years of schooling:

The numbering system recommended by the Australian Education Council in October 1974 has been adopted by ACER. They suggested that: '... the years of schooling be called Year 1 to Year 12, with the final year of secondary schooling being called Year 12, and numbering downward through primary school to Year 1 ...' (Report p. 2)

Published by The Australian Council for Educational Research Limited,
Radford House, Frederick Street, Hawthorn, Victoria 3122,
Printed and Bound by Jenkin Buxton Printers Pty.Ltd.,
1 Abbotsford Street, West Melbourne.

COPYRIGHT © ACER 1979

No part of this publication may be reproduced in any form without permission from the publisher.

contents

	page
1 description of the test	4
2 nature of the test	4
3 use of the test	4
4 directions for administration	7
5 scoring the test: the <i>Class Analysis Chart</i>	10
6 item classification	14
7 interpretation of results	16
8 preparation and use of local item data	19
9 profiles	23

1 description of the test

The *ACER Class Achievement Test in Mathematics* has been designed to survey the mathematical skills of children in Years 4 and 5. The test consists of 45 multiple-choice items, and it is suggested that the test should be completed in about 45 minutes.

Included in the set of *CATIM* materials are *Answer Strip Sheets*. Each answer sheet contains six tear-off answer strips which can be used in association with the *Class Analysis Chart*. Sections of the test are linked with the *ACER Mathematics Tests (AM series)*.

2 nature of the test

Since the *ACER Class Achievement Test in Mathematics* is based upon an 'Australian-average' syllabus, it would not be appropriate to use *CATIM* for precise comparisons of performance in the mathematics taught in a particular classroom. However the questions in each content area cover a range adequate to broadly assess the degree of progress of each individual.

Where further investigation is considered desirable, more precise information can be obtained by use of the more extensive *ACER Mathematics Tests (AM series)* which are related to each of the *CATIM* item groups on the *Class Analysis Chart*.

For a view of the whole class, the degree of mastery of those aspects of the mathematics course represented by individual *CATIM* items can be interpreted with sufficient accuracy to suggest appropriate teaching strategies.

3 use of the test

the role of *CATIM* and the *Class Analysis Chart*

The role of *CATIM* is to gather, and of the *Class Analysis Chart* to display, information about pupils' strengths and weaknesses in relation to all 45 aspects of primary mathematics sampled in this test. On average, one minute per item has been allowed but, as this is not a speeded test for ranking purposes, additional time may be allowed for slower pupils to attempt all 45 items. The fact that such pupils

might eventually master as many items as other pupils who worked more quickly emphasizes the difference between this test and one used for ranking relative achievement.

visual diagnosis

The process of evaluation involves more than just administering and marking a test. In the case of *CATIM*, some understanding of its interpretive potential using the *Class Analysis Chart* is not only desirable, but may also affect some of the procedural aspects of its use. These are mainly concerned with the arrangement of the answer strips on the *Class Analysis Chart* to provide patterns of visual information as a meaningful background to later interpretations. The visual diagnosis, obtained by visually scanning the chart, is based on discrepancies from complete rows of B's, C's, etc., the keyed responses for each item. As the discrepancies increase, this implies that items are more difficult and that pupils have less mastery.

To facilitate this visual diagnosis the *Class Analysis Chart* allows for different arrangements of pupils' answer strips.

strips arranged in alphabetical order

This is the least beneficial order for interpreting pupil responses because it is random with respect to the characteristics which affect mathematical ability.

strips grouped according to previous background

Responses of pupils from a common background (e.g. 'feeder' primary school) may be grouped and compared for each of the five main content areas. With this arrangement it may be possible to identify one or more blocks of below-average responses. This would suggest a need for compensatory learning activities in those areas for those groups.

strips arranged according to ability

Teachers could use some estimate of ability relevant to mathematics mastery to arrange the strips. One method would be to order the strips on the pupils' total scores on *CATIM* and consider relevant subgroups of pupils for interpretation.

For example, those pupils with a score of 30 or greater could be considered as a 'more able' group, and those with a score less than 30 as a 'less able' group, but this is purely arbitrary.

The relative difficulty of the items can then be identified by considering the number of discrepancies for each item. The easier items that the 'less able' group gets incorrect could be closely examined to find out why errors have been made. Such an analysis could provide a basis, and starting point, for remedial work for these pupils.

The 'more able' group would be expected to get the easier items correct and their mistakes on these items would most likely be trivial. However the more difficult items that pupils in this group get incorrect could be used as a basis for extension material for these pupils.

The relative difficulty of items can be more precisely established by the use of Class Item Facilities that are discussed in detail in section 8. In the preceding example, once the strips are arranged, teachers could use the Class Item Facilities to determine the relatively easy and difficult items.

strips arranged according to other information

Any information which teachers feel could systematically influence pupils' mastery levels could be used as the criterion for different arrangements of strips on the *Class Analysis Chart*. These could be attitudinal characteristics, rather than cognitive or social ones, and might be peculiar to the local situation. Some combination (such as ability within groups of common background) could also be possible.

Whatever arrangement is used, more specific interpretations suggested in sections 7 and 8 are equally applicable.

These four different arrangements of strips are presented for consideration prior to test administration and recording, to assist teachers in clarifying the diagnostic focus of their use of *CATIM* and the *Class Analysis Chart*.

4 directions for administration

general instructions

- 1 Ensure that sufficient time is available. It should take approximately 5 minutes to explain the directions to the pupils and about another 45 minutes testing time. However, *CATIM* is not a speeded test and whenever possible pupils should be given an opportunity to complete the test, or as much as they are able to do.
- 2 Make sure that sufficient *CATIM Test Booklets* and *CATIM Answer Strip Sheets* are available.

Teachers should note that each *Answer Strip Sheet* has 6 answer strips for use over 6 testings. So there is no need to purchase large quantities of test booklets. For example, if time is available, 60 pupils may be tested over 6 sessions, requiring only 10 *CATIM Test Booklets* and 10 *CATIM Answer Strip Sheets*.

- 3 Seat the pupils as you would normally do when they are taking a test and check that each has a pencil and eraser.
- 4 When giving directions to the class, teachers will need a copy of the *CATIM Test Booklet* and a *CATIM Answer Strip Sheet*, for reading and demonstrating.
- 5 Teachers should make sure that pupils understand what to do in the test and how to correctly record their answers by using the points covered in the specific instructions.

specific instructions

- 1 When starting the session you should inform the pupils that the *CATIM Test Booklet* contains a general mathematics test, as opposed to a topic test, and that you are interested in how well they can do it so that help can be given to those in need.
- 2 Distribute the *CATIM Test Booklets* and *CATIM Answer Strip Sheets*.
- 3 Ensure that pupils understand that they are to use the answer strip at the right side of the *CATIM Answer Strip Sheet*. The answer sheet is long (49 cm) and it is supplied folded. It is advisable to keep it folded while using it on a desk.
- 4 Tell pupils to write their initials at the top of the right hand answer strip, then to put their pencils down.
- 5* Depending on your particular class, either
 - (a) ask pupils to silently read the Introduction and Directions on the cover of the test booklet, or
 - (b) ask pupils to follow silently as you read these sections aloud.
- 6* Instruct the pupils to look at practice example P1. Pupils may read silently, or teacher read aloud, the information concerning P1, and demonstrate where box P1 is located if necessary.

* In steps 5 and 6 alternative procedures are suggested. Teachers should decide which is more appropriate for their particular classes. It is suggested that teachers endeavour to use the same procedure for all administrations of the test. This is desirable to make consistent comparisons across classes or time. (see p. 20 of this *Manual* for explanation and methods.)

- 7 Ensure that all pupils realize the letter B, *not* the number 7, is marked on the answer strip.
- 8 Pupils now consider practice example P2. Allow pupils to answer P2 in the appropriate space on the answer strip and establish that the correct response is D not 9.
- 9 Ask whether there are any questions about the information given.
- 10 Inform the pupils that they have about 45 minutes for the test. Explain to the pupils that they should not spend too much time on any one question, but come back to unfinished questions if they have time.
- 11 As you collect test booklets and answer strip sheets, make sure that each answer *strip* has the pupil's initials entered clearly.
- 12 Check that all test booklets and answer strip sheets have been handed in before concluding the testing activity.

5 scoring the tests: the class analysis chart

- 1 The set of CATIM materials includes *Answer Strip Sheets*. Each sheet incorporates six tear-off answer strips. These match the answer key on the *CATIM Class Analysis Chart*. The *Class Analysis Chart* is printed on both sides so that each chart may be used up to six times.
- 2 After administration of the test, the written-on answer strip is removed along the perforation and placed on the *Class Analysis Chart* (see photograph below).

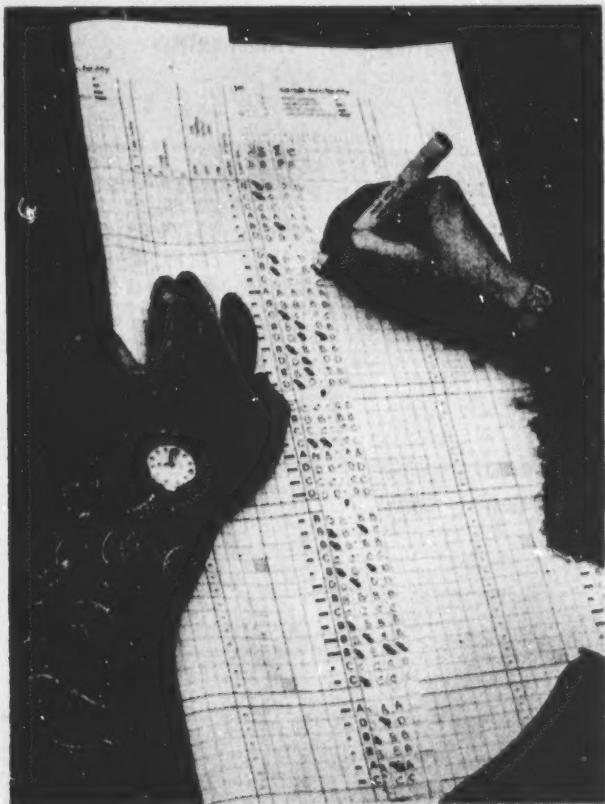


The strips have adhesive at the top and bottom which only needs moistening and the answer strips are fastened to a single column on the *Class Analysis Chart*. There is room on the *Class Analysis Chart* for the results of 35 children on each side, and a chart may be extended by joining two together.

- 3 When all results are entered on the *Class Analysis Chart*, the analysis may be completed in a number of stages as follows.

scoring

The photograph below shows the left edge of the *Class Analysis Chart* rolled over, exposing the key on the edge of the other side of the chart. (The right edge may be rolled over if this is more convenient.) The key is lined up with one column of answers, and the pupil's answers are marked. The key is then rolled one column across the *Class Analysis Chart*, and the next pupil's answers marked. This procedure is continued until all columns have been marked.



Some teachers might like to score across the chart marking each item in turn rather than each pupil, as this avoids having to continually consult the answer key.

sectional subtotals

These may be entered in the space provided if required.

analysis of class performance

This is completed at the right side of the *Class Analysis Chart*. The number of A's, B's, C's, D's chosen in each row should be entered in the appropriate column. The box corresponding to the correct answer is shaded, and the class item facility can be calculated using the formula:

class item facility conversion table

		number of pupils												
		1	2	3	4	5	6	7	8	9	10	11	12	13
10	10	20	30	40	50	60	70	80	90	100				
11	9	18	27	36	45	55	64	73	82	91	100			
12	8	17	25	33	42	50	58	67	75	83	92	100		
13	8	15	23	31	38	46	54	62	69	77	85	92	100	
14	7	14	21	29	36	43	50	57	64	71	79	86	93	
15	7	13	20	27	33	40	47	53	60	66	73	80	87	
16	6	13	19	25	31	38	44	50	56	63	69	75	81	
17	6	12	18	24	29	35	41	47	53	59	65	71	76	
18	6	11	17	22	28	33	39	44	50	56	61	67	72	
19	5	11	16	21	26	32	37	42	47	53	58	63	68	
20	5	10	15	20	25	30	35	40	45	50	55	60	65	
21	5	10	14	19	24	29	33	38	43	48	52	57	62	
22	5	9	14	18	23	27	32	36	41	45	50	55	59	
23	4	9	13	17	22	26	30	35	39	43	48	52	57	
24	4	8	13	17	21	25	29	33	38	42	46	50	54	
25	4	8	12	16	20	24	28	32	36	40	44	48	52	
26	4	8	12	15	19	23	27	31	35	38	42	46	50	
27	4	7	11	15	19	22	26	30	33	37	41	44	48	
28	4	7	11	14	18	21	25	29	32	36	39	43	46	
29	3	7	10	14	17	21	24	28	31	34	38	41	45	
30	3	7	10	13	17	20	23	27	30	33	37	40	43	
31	3	7	10	13	16	19	23	26	29	32	35	39	42	
32	3	6	9	13	16	19	22	25	28	31	34	38	41	
33	3	6	9	12	15	18	21	24	27	30	33	36	39	
34	3	6	9	12	15	18	21	24	26	29	32	35	38	
35	3	6	9	11	14	17	20	23	26	29	31	34	37	

number of pupils attempting item

$$\text{Class item facility} = \frac{\text{No. in shaded box}}{\text{No. of pupils completing item}} \times \frac{100}{1}$$

The class item facility can then be compared with either the sample item facility (see section 7) or with the item facilities established by the methods suggested in section 8.

The class item facilities as percentages have been calculated for class sizes up to 35 and are given in the conversion table below.

Correctly answering item

	4	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
0																						
1	8	100																				
2	8	88	94	100																		
3	8	83	89	94	100																	
4	7	79	84	89	95	100																
5	7	75	80	85	90	95	100															
6	7	71	76	81	86	90	95	100														
7	6	68	73	77	82	86	91	95	100													
8	6	65	70	74	78	83	87	91	96	100												
9	6	63	67	71	75	79	83	88	92	96	100											
10	5	60	64	68	72	76	80	84	88	92	96	100										
11	5	58	62	65	69	73	77	81	85	88	92	96	100									
12	5	56	59	63	67	70	74	78	81	85	89	93	96	100								
13	5	54	57	61	64	68	71	75	79	84	86	89	93	96	100							
14	5	52	55	59	62	66	69	72	76	79	83	86	90	93	97	100						
15	5	50	53	57	60	63	67	70	73	77	80	83	87	90	93	97	100					
16	4	48	52	55	58	61	65	68	71	74	77	81	84	87	90	94	97	100				
17	4	47	50	53	56	59	63	66	69	72	75	78	81	84	88	91	94	97	100			
18	4	45	48	52	55	58	61	64	67	70	73	76	79	82	85	88	91	94	97	100		
19	4	44	47	50	53	56	59	62	65	68	71	74	76	79	82	85	88	91	94	97	100	
20	4	43	46	49	51	54	57	60	63	66	69	71	74	77	80	83	86	89	91	94	97	100

6 item classification

the structure of the test

Content category	AM No.	Knowledge	Computational skill	Application	Understanding	No. of questions
Counting and Place Value	1, 2	2, 5, 6			1, 3, 4	6
Whole Numbers	4	9, 14	13	7, 8, 10	11, 12, 15	9
Money	5		18	17	16	3
Common Fractions	6		21, 22	19	20	4
Decimal Fractions	7		26		23, 24, 25	4
Spatial Relations	3		29	28	27	3
Graphs	14		37		30	2
Length	9	32	31, 34		33	4
Area	10		35	36		2
Volume and Capacity	12		38		39	2
Mass and Weight	11	40, 41				2
Time	13	42, 43, 45			44	4
No. of Questions		11	11	7	16	45

interpretation of the structure

To facilitate the interpretation of test results, CATIM has been organised into item groups (see *Class Analysis Chart* and above

table) which represent a common division of mathematics content used for instruction. If further investigation in any group is required these have been related to appropriate tests in the *ACER Mathematics Tests (AM Series)*. Details are discussed in section 7 of the *CATIM Manual*.

Item classification k, c, a, u

Each item has also been classified into four relatively distinct areas which describe in general the nature of the thinking process required to answer the item. These are Knowledge, Computation, Application, and Understanding.*

knowledge

Items classified as belonging to this type require that the pupil will have mastered the terminology, the symbols, and many of the factual relationships of mathematics.

computation

Items classified as belonging to this type concern the pupil's ability to perform recognized mathematical processes accurately and within a reasonable period of time.

application

Items classified as belonging to this type are interested in the pupil's ability to apply his knowledge, skill, and understanding of mathematics.

understanding

Items classified as belonging to this type require the pupil to identify principles and relationships, and to reach valid generalizations.

Although an attempt is made to classify the items, it must be realised that this classification will not necessarily be the same for all pupils. It will vary according to the ability level, experience and attainment of the pupils concerned. However, as a guideline for instructional purposes the organization of items into these four types, and their level of difficulty (see section 8, *Class Item Facilities*) will assist the teacher to make judgments concerning the class or pupil's readiness for remediation or enrichment in particular content areas. (See 'Item group' on the *Class Analysis Chart*.)

*ACER *Background in Mathematics*, 2nd ed. Hawthorn: ACER, 1972. p. 251.

7 interpretation of results

Before beginning to interpret results, examine item classifications discussed in section 6 and preferably individual items in the *ACER CATIM* Test. Results on any items that seem irrelevant to the class may be ignored. It will be assumed in what follows that *CATIM* is appropriate for the class in the sense suggested in section 2.

Specific interpretation of individual performance on particular items is limited until it can be placed in the broader context of

- 1 class results across content areas
- 2 class results on particular items
- 3 individual results across content areas.

These broader contexts will be discussed with reference to completed details of the *CATIM Class Analysis Chart*.

The items on *CATIM* have been arranged in five content areas, in groups ranging in size from six to thirteen. As previously mentioned, these content areas are linked with the fourteen tests of the *ACER AM Series*, which have the potential for more thorough investigation.

1 class results across content areas

Pupil sub-totals in each content area can be averaged and compared with the expected maximum. For example, in the content area 'Whole Numbers and Money' the maximum is 12, so an average pupil sub-total of 8.4 implies average facility of 70% in this area. As local norms of this kind are established (see section 8) the relevance of this level of mastery can be interpreted in relative as well as absolute terms.

A profile of class mastery levels has general implications for teaching emphases across those areas. However it is also important to consider the spread of pupil sub-totals relative to the average in each area. If the range is narrow, teaching of the whole class as a group is implied, but a wider spread would imply different learning needs for pupils at the extremes in each content area.

2 class results on particular items

Prior to obtaining local trends of item facilities in each area, the pattern of facilities can be compared with those quoted from the ACER sample data on the *Class Analysis Chart*. Any marked discrepancies may be due to the different teaching emphases in previous years and could imply a need for remediation if the item objectives are considered important. As local item data are built up, the relevance of such discrepancies would become clearer.

Item facilities within each content area can be ordered to suggest a sequence of mastery of items. The implications for further teaching in that area should be assisted by this information, both for class groups and for individuals. Besides considering item facilities, the frequency of pupil choice of incorrect options can provide insight concerning common errors.

The table below shows five examples of commonly chosen wrong alternatives with possible explanations.

examples of common errors

ITEM NUMBER	WRONG ALTERNATIVE	POSSIBLE EXPLANATION
10	A	A misunderstanding of the question being posed. These pupils found the product of 18 and 6.
15	D	One of the possible patterns (doubling) was applied without checking that it was appropriate in all instances.
20	C	A misunderstanding of this question. These pupils chose the fraction not shaded.
22	A	A misunderstanding of the relation between whole numbers and fractions. Pupils added the 2 to the numerator 4.
38	C	Pupils counted the visible faces of blocks instead of visualizing the blocks.

3 Interpretation of results for individuals

The sub-totals for each pupil, compared with the possible maximum, provide a profile of his mastery across the areas of *CATIM*. These can be interpreted in two ways:

- I Relative to his own ability, the student may be stronger or weaker in particular content areas. When broad weaknesses in one or more content areas are identified, the nature of errors in particular items may suggest remedial needs. Further investigation with the associated *AM Series* tests may assist in clarifying sources of learning problems.
- II The seriousness of such problems may be assessed relative to the average sub-totals for the class in each area. Depending on these comparisons, remediation may be undertaken within the total classroom teaching situation, or within groups of pupils with similar problems, or by individual teaching.

The preceding points 1 to 3 set the context within which individual student responses to particular items can be viewed and relative mastery of particular item objectives inferred. Teachers may also wish to explore whether pupils show different levels of mastery with respect to the various process groups (items designated k, c, a, u).

Although further investigation with related tests has been advocated as a source of more precise information, the value of teacher observation of pupil performance in classroom activities must also be emphasised. The interpretation of results of *CATIM* is primarily intended to establish the dimensions within which continuing evaluation can be more meaningful.

8 preparation and use of local item data

CATIM is not a norm-referenced test, and as such was not designed to measure the pupil's performance in relation to a representative sample from a population of the pupil's peers. The purpose of CATIM is to provide information about a pupil's strengths and weaknesses in mathematics, and as a technique it employs class item facilities.

class item facilities

After answer strips have been attached to the *Class Analysis Chart*, or the answers manually recorded, the class item facilities can be calculated using the method shown in the following example (see also section 5):

Example calculation of class item facilities:

sample item facility

easiest questions	•
average questions	••
difficult questions	•••
most difficult questions	••••

7	6	5	4	3	2	1
						item number
						P1
						P2
						A B C D
						1 P 5 20 2
						2
						3
						4
						5
						6
						item facilities school uses
						date
						date
						date
						sample item facility
						answer key
						• C
						• D
						• B
						• A
						• A
						• B

The numbers entered in the boxes A, B, C, and D are the numbers of pupils who chose that alternative, for this particular item. Number in shaded box = 20.

Number of pupils completing item = $8 + 5 + 20 + 2 = 35$.

Therefore using the formula given in section 5, class item facility for this item

$$\begin{aligned} &= \frac{20}{35} \times \frac{100}{1} \\ &= 57\%. \end{aligned}$$

The class item facility can also be gained by using the conversion table in section 5.

The facility can be recorded in the appropriate column of the 'item facilities, school use' section of the *Class Analysis Chart*. In this case it would be written in the box indicated in the diagram.

Class item facilities represent the proportion of correct responses on an item. So a high item facility means the item is reasonably easy and a low item facility means the item is more difficult. From these facilities an item order of difficulty for your class or group of pupils can be observed, and this may vary from the sample data facilities given on the *Class Analysis Chart* by the 'dot code'.

raw score and item facilities

The *raw score* is the number of items on the test answered correctly by a pupil. This can only be used to compare the performance of different pupils in the same grade who do the test at the same time. So it is of limited value. For wider application the use of class item facilities is recommended for comparisons.

use of class item facilities

It is suggested that teachers may use class item facilities to compare groups of pupils in the following two ways:

'within years

Class item facilities can be used to compare the classes in any one year provided these classes, or groups of pupils, are at the same grade level and they did the test at about the same time of

that year. Little information can be gained by comparing the item facilities of two grade 5 classes, if one did *CATIM* in March and the other in September. In this situation differences would be expected because of the more time one group of pupils had with mathematics at school.

A *Within Years* comparison would indicate the relative areas of strength or weakness between different classes or groups of pupils within the school.

between years

It may also be useful to compare classes, using the item facilities, progressively over years. Provided the classes are at the same grade level and attempted *CATIM* at about the same time of the year this is valid. For example a teacher may look at the class item facilities for his grade 5 classes from 1977 to 1979. On inspection these facilities might show that the 1978 class had generally lower class item facilities for the item groups 'Measurement I' than the 1977 class. This could suggest to the teacher that he has decreased his emphasis on measurement. Or if the test was given in the early part of the year then this could perhaps indicate that the previous teacher dealt very little with this area. Both possibilities would have instructional implications.

The *Between Years* facilities can also be used by the school to prepare local norms. This is achieved by cumulative consideration of the class item facilities over years, as shown in the Table below.

yearly class item facilities

Item	Year			Cum.I.F.
	1977	1978	1979	
1	60	70	60	66.6%
2	45	55	50	50%

The preparation of such local norms could provide the teacher with a useful reference point for successive classes. Also it would be of benefit from the teacher's point of view in relation to new pupils to the school. A new pupil to the school could take *CATIM* and have his

test analysed in relation to the local norms. As a result some of the problems a pupil might have in the new school would be identified in advance and the teacher could act accordingly to help the pupil.

As a general guideline, the class item facilities can be useful. However care must be taken not to over-interpret from this information. More definite judgments should only be made after further investigation in the directions that the *CATIM* suggests to the teacher. For example, use of the related *AM Series* would provide more definite information because it provides 30 to 40 items on the areas for which *CATIM* has only one or two.

subtotals

raw score

Use may also be made of the sectional subtotals. (See section 7.) This involves the summation of the raw scores for each of the separate item groups as marked on the *Class Analysis Chart*. These raw score totals may emphasize which content areas (for example, Fractions) pupils are finding difficult. Note that these sub-totals can only be used *within a particular class*. Because these sub-totals are raw scores, the information they provide is class specific.

class item facility

The average class item facility for a content area can be established by summing the facilities in that area (see *Class Analysis Chart*) and dividing by the number of facilities that were summed. These 'average item facilities' can be compared for the class to see the relative difficulty of the different content areas.

(N.B. The 'average item facility' for a content area should be the same as the average of the sub-totals for that area when this is taken as a percentage.)

9 profiles

Individual and class profiles can be built up by reproducing the 'structure of CATIM' grid on page 14 of this manual and summarizing either individual or class data as illustrated on the next two pages.

This suggestion was derived from the work of Mr J. Cox, Box Hill Technical College.

CATIM CLASS PROFILE

Form/Class _____ Date _____

Comments _____

Bold entries are total correct for item.

Content category	AM No.	Knowledge	Computational skill	Application	Understanding	No. of questions
Counting and Place Value	1, 2	16, 13, 14 2, 5, 6			6, 8, 14 1, 3, 4	6
Whole Numbers	4	12, 7 9, 14	4 13	15, 6, 12 7, 8, 10	15, 15, 8 11, 12, 15	9
Money	5		7 18	9 17	15 16	3
Common Fractions	6		14, 12 21, 22	7 19	18 20	4
Decimal Fractions	7		16 26		15, 10, 12 23, 24, 25	4
Spatial Relations	8		10 29	17 28	16 27	3
Graphs	14		20 37		21 30	2
Length	9	9 32	15, 17 31, 34		8 33	4
Area	10		14 35	16 36		2
Volume and Capacity	12		11 38		13 39	2
Mass and Weight	11	7, 9 40, 41				2
Time	13	8, 4, 3 42, 43, 46			12 44	4
No. of Questions		11	11	7	16	45

CATIM INDIVIDUAL PROFILE

Name _____

Form/Class _____ Date _____

Comments _____

Circled items not correct.

Content category	AM No.	Knowledge	Computational skill	Application	Understanding	No. of questions	No. Not correct
Counting and Place Value	1, 2	② 5, 6			1, 3, 4	6	1
Whole Numbers	4	⑨ 14	⑬	7, ⑧ 10	11, ⑫ 15	9	4
Money	5		18	17	16	3	
Common Fractions	6		21, 22	19	⑳	4	1
Decimal Fractions	7		26		23, 24, ②5	4	1
Spatial Relations	8		②9	28	②7	3	2
Graphs	14		37		30	2	
Length	9	32	31, 34		33	4	
Area	10		③5	③6		2	2
Volume and Capacity	12		③5		39	2	1
Mass and Weight	11	④0 41				2	1
Time	13	42, ④3 45			44	4	1
No. of Questions		11	11	7	16	45	
No. Not correct		4	4	2	4		14

Advisory Note for Teachers
ACER MATHEMATICS TESTS
AM SERIES TOPIC TESTS
(1970-1977)

Range: Years 4-6; Year 7 in SA, Qld, WA.

Materials: Four- or eight-page booklet for each test; 17 re-usable, 3 expendable; separate scoring key for each test; standard answer sheet for use with all re-usable tests; manual.

Time: Instructions, about 10-15 minutes.
 Tests, 30 minutes each.

Description:

AM1	Numeration, Counting and Number Patterns	
AM2	Place Value	
AM3	Sets	
AM4	Whole Numbers	I Mathematical Ideas II Mathematical Terms) one III Applications) booklet IV Computation*
AM5	Money	
AM6	Common Fractions	I Mathematical Ideas II Mathematical Terms) one III Applications) booklet IV Computation*
AM7	Decimal Fractions	I Mathematical Ideas II Mathematical Terms) One III Applications) booklet IV Computation*

* not re-usable

Continued on back cover

Advisory Note for Teachers

ACER MATHEMATICS TESTS

AM SERIES TOPIC TESTS (1970-1977)

Description:	AM8	Spatial relations
(contd)	AM9	Length
	AM10	Area
	AM11	Weight
	AM12	Capacity and Volume
	AM13	Time
	AM14	Graphs

Within each topic, questions probe development and understanding of mathematical ideas, knowledge of specific facts, conventions and procedures, skill in computation, interpretation and application.

The manual provides instructions for administration, and classification of the items in each test by content, and by cognitive skill (i.e. knowledge, computational skills, understanding, applications).

The norm data provided in the manual were collected at three different times - May 1971, May 1972 and November 1977. Norms are presented in the form of grade based stanines. Not all tests have been normed in every state. The list below provides details.

1971 - AM1, 2, 4, 5, 13

Years 4 - 6: all states except NSW.

1972 - AM3, 6, 7

Years 4 - 6: all states except NSW.

Year 7: SA, Qld, WA.

1977 - AM8, 9, 10, 11, 12, 14

Years 4 - 6: all states including NSW.

Year 7: SA, Qld, WA.

australian council for educational research

CATIM

class achievement test in mathematics

YEAR 4/5

test booklet



introduction

The CATIM test is intended to be used by your teacher to find out which parts of your mathematics work you can do well and which parts you cannot.

The test has questions selected from many different parts of the mathematics that you have learned at school.

directions

For all questions on this test 3 or 4 possible answers are given, but only one is correct. You are to choose the answer you think is correct.

The following practice examples will show you how to answer the questions in the test.

Wait until you are told how to answer the questions before going on.

practice examples

P1 $3 + 4$ equals

- A 6
- B 7
- C 8
- D 9

Since $3 + 4 = 7$, B has been written in box P1 on the answer strip.

P2 Which of these numbers is the smallest?

- A 12
- B 10
- C 14
- D 9

Write the answer you choose in the box P2 on your answer strip. Your teacher will check whether you have written the correct letter before you start the test.

Please do not make any marks in this booklet.

background information for teachers

CATIM is intended to survey the extent to which individuals and class groups have mastered some important aspects of primary mathematics.

To assist in interpretation, pupil data is entered on specially designed CATIM answer strip sheets, which can be attached to the CATIM class analysis chart. Some interpretation procedures are summarized in the CATIM manual.

Further investigation of pupil understanding can be pursued by use of the related ACER Mathematics Tests (AM Series).

The recommended time for the CATIM test is about 45 minutes.

TM 800247 2 of 2

CATIM

class achievement test in mathematics

YEAR 4/5

answer strip sheet

students

● Use the answer strip at the far right side of this sheet of answer strips.

● Write your initials at the top of the far right answer strip when you are told. Write your answers down this answer strip.

● Only write answers alongside the question numbers. Miss a space where there is a large arrow.

● Do not tear the answer strip off when you have finished.

teachers

This format has been chosen because single answer strips would be unmanageable for pupils. Each CATIM answer strip sheet can be used for six testings. The answer strips can later be fastened onto the CATIM class analysis chart. For details please consult CATIM manual.

COPYRIGHT © ACER 1979

Published by

The Australian Council for Educational Research Limited,
Radford House, Frederick Street, Hawthorn, Victoria 3122

students initials	students initials	students initials	students initials	students initials	students initials	students initials
P1	B	P1	B	P1	B	P1
P2		P2		P2		P2
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
↓	↓	↓	↓	↓	↓	↓
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9
10	10	10	10	10	10	10
11	11	11	11	11	11	11
12	12	12	12	12	12	12
13	13	13	13	13	13	13
14	14	14	14	14	14	14
15	15	15	15	15	15	15
16	16	16	16	16	16	16
17	17	17	17	17	17	17
18	18	18	18	18	18	18
↓	↓	↓	↓	↓	↓	↓
19	19	19	19	19	19	19
20	20	20	20	20	20	20
21	21	21	21	21	21	21
22	22	22	22	22	22	22
23	23	23	23	23	23	23
24	24	24	24	24	24	24
25	25	25	25	25	25	25
26	26	26	26	26	26	26

27	27	27	27	27	27	
28	28	28	28	28	28	
29	29	29	29	29	29	
30	30	30	30	30	30	
31	31	31	31	31	31	
32	32	32	32	32	32	
33	33	33	33	33	33	
34	34	34	34	34	34	
35	35	35	35	35	35	
36	36	36	36	36	36	
37	37	37	37	37	37	
38	38	38	38	38	38	
39	39	39	39	39	39	
↓	↓	↓	↓	↓	↓	↓
40	40	40	40	40	40	
41	41	41	41	41	41	
42	42	42	42	42	42	
43	43	43	43	43	43	
44	44	44	44	44	44	
45	45	45	45	45	45	

- 1 The number, one more than 70 is
 A 701 C 71
 B 170 D 710

- 2 Which set of numerals shows counting by fives?
 A 57, 59, 61, 63, 65
 B 45, 48, 51, 54, 57
 C 31, 35, 39, 43, 47
 D 47, 52, 57, 62, 67

- 3 Which of these numbers is smaller than 57 and larger than 29?
 A 92 C 75
 B 43 D 27

- 4 49, 44, 39, 34, —, —, 19
 The missing numbers are
 A 29, 24 C 39, 44
 B 35, 36 D 33, 32

- 5 One thousand and fifty-seven written in figures is
 A 1 057 C 157
 B 10 057 D 100 057

- 6 What is the same as 408?
 A 48 tens
 B 4 hundreds and eight units
 C 40 hundreds and 8 units
 D 4 tens and 8 units

- 7 Sandra saved 47 swap cards. Then Stan gave her 27 swap cards. How many swap cards did she have then?
 A 20 C 74
 B 64 D 1 269

- 8 Rod had 25 gum nuts. He found 19 more gum nuts. Which equation could you use to find the number of gum nuts he had altogether?
 A $\Delta + 19 = 25$
 B $\Delta = 25 + 19$
 C $19 + \Delta = 25$
 D $25 - \Delta = 19$

- 9 Which of the following is an equation?
 A $2 \times 3 \neq 7$
 B $15 + 4 + 3$
 C $84 \div 7$
 D $17 = 17$

- 10 A block of chocolate can be broken into 18 pieces. There are 6 pieces in each row. How many rows are there?
 A 3 C 24
 B 12 D 108

- 11 Which names the largest number?
 A (257×4) C $(257 - 4)$
 B $(257 \div 4)$ D $(257 + 4)$

- 12 Which number sentence is not true?
 A $43 + 43 = 1$
 B $43 - 43 = 0$
 C $43 + 1 = 43$
 D $43 \times 0 = 43$

- 13 The number nearest in value to 7×97 is
 A 750 C 650
 B 700 D 600

- 14 Another name for $7 \times \Delta$ is
 A $(3 \times 4) \times \Delta$
 B $(3 \times 4) + \Delta$
 C $(3 + 4) \times \Delta$
 D $(4 \times 3) + \Delta$

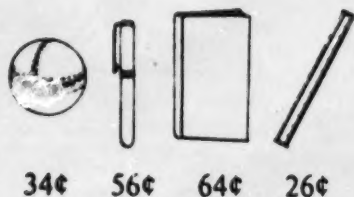
- 15 Look at this pattern.

24		51	16	36
12	9	39		24

The missing numbers are

- A 21 and 27 C 21 and 4
B 18 and 8 D 18 and 32

- 16 Bob has 80¢.



Which of the above must he buy in order to get 16¢ change?

- A the ruler C the ball
B the pen D the book

- 17 How many of these coins make one dollar and fifty cents?

- A 15
B 25
C 5
D 6



- 18 Mary gave the shopkeeper \$2.00 and this was her change.



How much did she spend?

- A \$1.05 C \$1.55
B \$1.50 D \$1.45

- 19 Six children each ate $\frac{1}{3}$ of a block of chocolate. How many blocks of chocolate were eaten?

- A 1 C 2
B $1\frac{1}{3}$ D $2\frac{1}{3}$

- 20 What fraction of this figure is shaded?



- A $\frac{3}{4}$ C $\frac{1}{4}$
B $\frac{1}{2}$ D $\frac{3}{4}$

- 21 In which pair are the fractions equal?

- A $\frac{3}{3}, \frac{4}{3}$ C $\frac{3}{3}, \frac{3}{8}$
B $\frac{3}{3}, \frac{6}{10}$ D $\frac{4}{3}, \frac{6}{10}$

- 22 Which one of these fractions is equal to $2\frac{4}{5}$?

- A $\frac{6}{3}$ C $\frac{13}{5}$
B $\frac{9}{3}$ D $\frac{14}{5}$

- 23 0.2 multiplied by 4 is equal to

- A $0.2 + 0.2 + 0.2 + 0.2$
B $0.2 \times 0.2 \times 0.2 \times 0.2$
C $0.8 \times 0.8 \times 0.8 \times 0.8$
D $0.8 + 0.8 + 0.8 + 0.8$

- 24



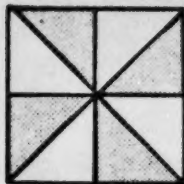
What fraction of the figure is shaded?

- A 0.2 C 0.4
B 0.3 D 0.5

- 25 Which of the following fractions is larger than $\frac{1}{2}$ and smaller than $\frac{2}{3}$?

- A 0.1 C 0.5
B 0.4 D 1.2

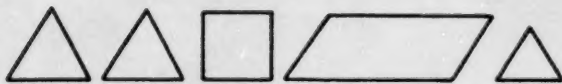
26



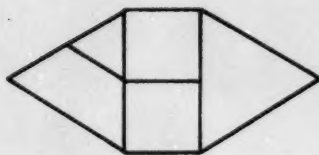
What fraction of the figure is shaded?

- A 0.2
B 0.3
C 0.4
D 0.5

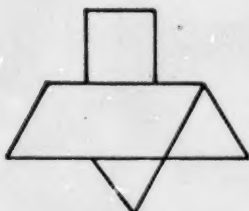
27 Which of the shapes below could be built from all these shapes?



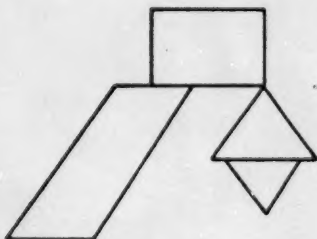
A



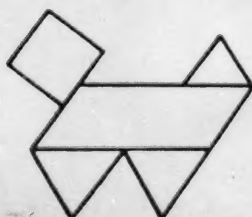
B



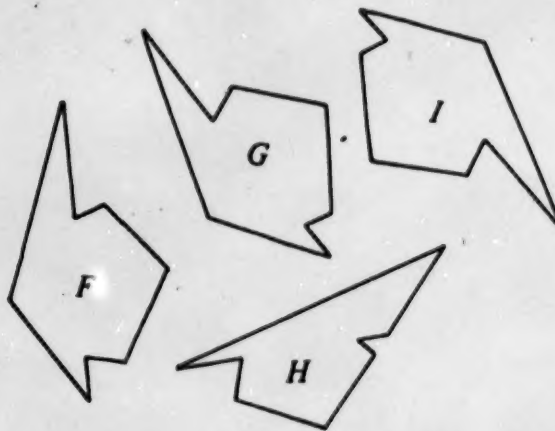
C



D

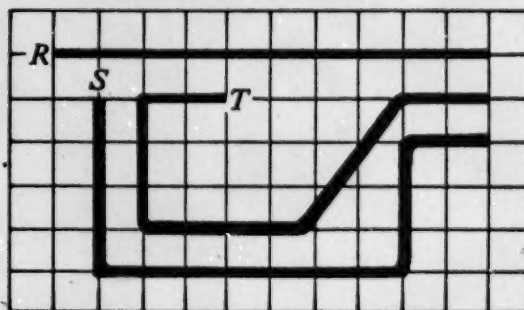


28 Which shape is different?



- A shape F C shape H
B shape G D shape I

29 Which piece of string is longest?



- A piece R
B piece S
C piece T
D There is no way of telling.

30 These are marbles owned by four boys.



Peter



John

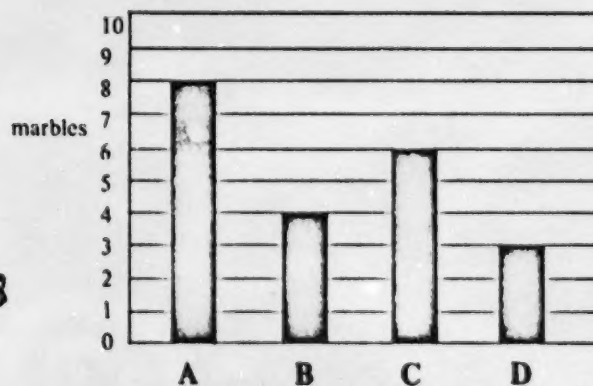


Ted



Don

Which column shows the number of marbles Peter has?



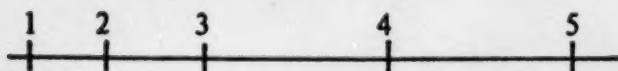
- 31 How many pieces, 20 centimetres long, can be cut from a 1-metre length of string?

A 5 pieces
B 6 pieces
C 12 pieces
D 8 pieces

- 32 Mary buys a length of ribbon to make two bows for her hair. Which length is she most likely to buy?

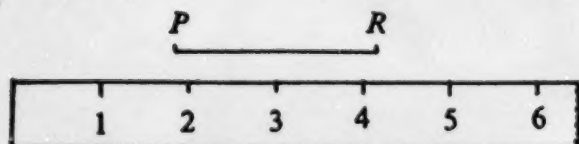
A 1 millimetre
B 1 centimetre
C 1 metre
D 1 kilometre

- 33 Which of the following parts of this line segment is the longest?



A from 2 to 4
B from 1 to 3
C from 3 to 5
D from 4 to 5

34



How long is the line PR to the nearest unit?

A 4 units
B 5 units
C 3 units
D 2 units

- 35 Which one of the following shapes has the same area as this shape?

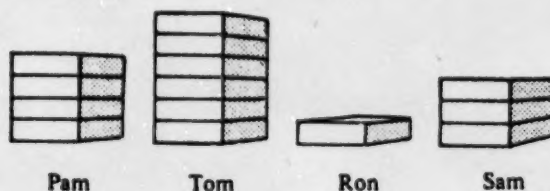


- 36 Which two shapes have the same area?



A W and X
B W and Y
C X and Z
D Y and Z

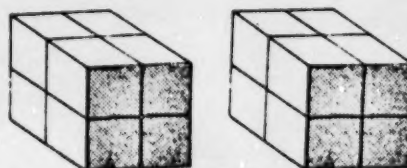
- 37 Four children collected matchboxes and stacked them like this.



Who collected one less matchbox than Pam?

A Tom
B Ron
C Sam
D none of them

- 38 Here is a back view and front view of a stack of blocks.



How many blocks are in the stack?

A 4
B 8
C 12
D 16

- 39 Container L holds 5 cups of sand. Container M holds 8 cups of sand.



Container L holds

A less than container M .
B the same as container M .
C more than container M .

- 40 Tom can lift this box.



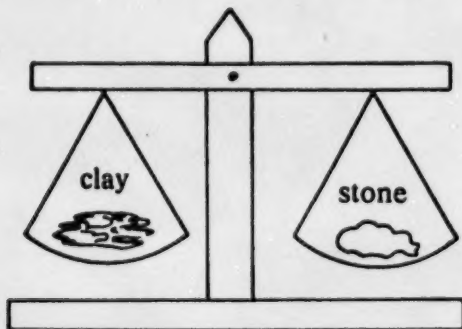
Tom cannot lift this box.



Which box is heavier?

- A box K
- B box L
- C There is no way of telling.

- 41 Which sentence is true?



- A The stone is heavier than the clay.
- B The stone is lighter than the clay.
- C The stone is the same weight as the clay.
- D You cannot tell anything about the weight of the stone or the clay.

- 42 The time shown on this clock is

- A 8 o'clock
- B 6 o'clock
- C quarter past 8
- D half past 8



- 43 Which clock shows the time as quarter past 6?



- A clock K
- B clock L

- C clock M
- D clock N

- 44 A clock shows the time of 12 o'clock as the children go out to play.
If the clock is correct, the time is probably

- A midday.
- B midnight.
- C mid-morning.
- D mid-afternoon.

- 45 Which clock shows the time as 23 minutes to 5?



- A clock G
- B clock H

- C clock I
- D clock J